

IN THE CLAIMS

1. (Currently amended) In an integrated circuit (IC) digital communication relay device, a method for providing redundancy comprising:

receiving communications encoded with forward error correction (FEC) on a first receive path and a second receive path;

decoding the received communications;

correcting byte errors in the decoded communications using the forward error correction;

monitoring the first and second receive paths for communication integrity by monitoring the corrected byte errors in the decoded communications in the first and second receive paths; and

selecting a receive path in response to monitoring the first and second receive paths for communication integrity.

2. (Canceled)

3. (Currently amended) The method of claim 2 1 further comprising:

following selecting a path in response to monitoring communications, encoding the communications with forward error correction; and transmitting the encoded communications.

4. (Original) The method of claim 3 wherein transmitting the encoded communications includes transmitting the encoded communications on a first transmit path and second transmit path; and

the method further comprising:

monitoring the communications on the first and second transmit paths for communication integrity; and

selecting a transmit path in response to monitoring communications integrity on the first and second transmit paths.

5. (Original) The method of claim 4 further comprising:

decoding the transmitted communications

correcting byte errors in the decoded transmitted communications using the forward error correction; and

wherein monitoring the first and second transmit paths for communication integrity includes monitoring the corrected byte errors in the decoded transmit communications.

6. (Original) The method of claim 5 further comprising:

selecting the first transmit path;

monitoring the first transmit path for communication integrity;

detecting communication integrity problems in the first transmit path; and

switching to the second transmit path.

7. (Currently amended) The method of claim 1 in which the communications are organized in a digital frame structure with overhead, payload, and forward error correction sections;

wherein monitoring the first and second receive paths includes using the forward error correction to determine the bit error rate of the decoded received communications; and

wherein selecting a receive path in response to monitoring the first and second receive paths for communication integrity includes selecting a receive path in response to the bit error rate.

8. (Currently amended) The method of claim 7 wherein monitoring the first and second transmit receive paths for communication integrity includes monitoring the overhead sections for frame synchronization bytes; and

wherein selecting a receive path in response to monitoring the first and second receive paths includes selecting a path in response to monitoring frame synchronization bytes.

9. (Original) The method of claim 1 further comprising:

selecting the first receive path;

monitoring the first receive path for communication integrity;

detecting communication integrity problems in the first receive path; and

switching to the second receive path.

10. (Currently amended) In an integrated circuit (IC) digital communication relay device, a method for providing redundancy comprising:

receiving communications encoded with forward error correction (FEC) from a first node;

decoding the received communications;

correcting byte errors in the decoded communications using the forward error correction;

monitoring the received communications for communication integrity by monitoring the corrected byte errors; and

selecting a path from the first node in response to monitoring communication integrity.

11. (Original) The method of claim 10 further comprising:

transmitting the communications to a second node;

monitoring the transmitted communications for communication integrity;

and

selecting a path to the second node in response to monitoring communication integrity.

12. (Canceled)

13. (Currently amended) The method of claim 12 11 further comprising:

following the decoding of the received communications, encoding the decoded communications with forward error correction; and

wherein transmitting the communications to a second node includes transmitting encoded communications.

14. (Original) The method of claim 13 wherein transmitting the encoded communications includes transmitting the encoded communications on a first transmit path and second transmit path;

wherein monitoring the transmitted communications for communication integrity includes monitoring the transmitted communications on the first and second transmit paths for communication integrity; and

selecting a transmit path to the second node in response to monitoring communication integrity includes selecting a transmit path in response to monitoring communications integrity on the first and second transmit paths.

15. (Original) The method of claim 14 further comprising:
receiving the transmitted communications at the second node; and
the method further comprising:
decoding the transmitted communications at the second node;
correcting byte errors in the transmitted and decoded communications, at the second node, using the forward error correction;
sending a status message from the second node with an indication of byte error corrections; and
wherein monitoring the transmitted communications for communication integrity includes receiving the status message from the second node.

16. (Original) The method of claim 15 further comprising:
selecting the first transmit path;
monitoring the first transmit path for communication integrity;
detecting communication integrity problems in the first transmit path; and
switching to the second transmit path.

17. (Original) The method of claim 16 wherein receiving communications includes receiving communications on a first receive path and second receive path;

wherein monitoring the received communications for communication integrity includes monitoring the received communications on the first and second receive paths for communication integrity; and

selecting a receive path in response to monitoring communication integrity includes selecting a receive path in response to monitoring communications integrity on the first and second receive paths.

18. (Original) The method of claim 17 further comprising:

selecting the first receive path;

monitoring the first receive path for communication integrity;

detecting communication integrity problems in the first receive path; and

switching to the second receive path.

19. (Original) The method of claim 11 in which the communications are organized in a digital frame structure with overhead, payload, and forward error correction sections;

wherein monitoring communications includes monitoring overhead bytes in the overhead section.

20. (Original) The method of claim 19 wherein monitoring the overhead section for overhead bytes includes monitoring the overhead sections for frame synchronization bytes.

21. (Canceled)

22. (Currently amended) An integrated circuit (IC) digital communication relay device for providing redundancy, the device comprising:

a receive monitor having a first input connected to a first receive path and a second input connected to a second receive path, the receive monitor monitoring the integrity of communications including digital frame structures having overhead, payload, and forward error correction sections on the first and second receive paths by monitoring integrity criteria selected from the group including overhead bytes, synchronization status, loss of clock, bit error rate, and signal to noise ratio and supplying a control signal responsive to the communication integrity at a first output, the receive monitor supplying the communications from the first receive path to a second output and communications from the second receive path to a third output; and

a receive switch having a first input connected to the receive monitor second output, a second input connected to the receive monitor third output, and a third input connected to the receive monitor first output, and an output to supply communications from the selected input in response to the control signal.

23. (Canceled)

24. (Original) The device of claim 22 further comprising:

a transmit switch having a first input to accept communications for transmission, a second input to receive a control signal, a first output, and a second output to selectively supply communications in response to the control signal; and

a transmit monitor having a first input connected to the transmit switch first output and a second input connected to the transmit switch second output, the transmit monitor monitoring the integrity of communications on the first and second inputs and supplying a control signal responsive to the communication integrity at a first output, the transmit monitor supplying the communications from the first input to a first transmit path and communications from the second input to a second transmit path.

25. (Original) The device of claim 24 further comprising:

a transmitter having an input to accept communications for transmission and supplying the communications on a first output connected to the transmit switch first input.

26. (Original) The device of claim 25 in which the transmitted communications are digital frame structures having overhead, payload, and forward error correction sections; and

wherein the transmit monitor monitors integrity criteria selected from the group including overhead byte recognition, frame synchronization bytes, clock loss, bit error rate, and signal to noise ratio.

27. (Original) The device of claim 25 wherein the transmit monitor has a third input to receive status messages concerning the integrity of communications transmitted on the first and second transmit paths;

wherein the transmit monitor supplies control signals responsive to the received status messages; and

wherein the transmit switch selects an output in response to the status messages received at the transmit monitor third input.

28. (Original) The device of claim 27 in which received communications are encoded with forward error correction (FEC);

the device further comprising:

a receiver having an input connected to the receive switch output to process communications, the receiver having an output to supply processed communications received on the selected receive path;

a decoder having an input selectively connected to the receiver output and an output to supply decoded communications, where byte errors in the decoded communications have been corrected using the forward error correction; and

an encoder having an input selectively connected to the decoder output, and an output connected to the transmitter input to supply encoded communications with forward error correction.

29. (Original) The device of claim 28 wherein the receive monitor has a third input connected to the decoder output, the receive monitor supplying a receive switch control signal in response to the number of byte error corrections made by the decoder; and

wherein the receive switch selects an input in response to the number of byte error corrections.

30. (Currently amended) A system of integrated circuit (IC) digital communication relay devices for providing redundancy, the system comprising:

a first relay including:

a transmit switch having a first input to accept communications for transmission, a second input to receive a control signal, a first output, and a second output to selectively supply communications in response to the control signal; and

a transmit monitor having a first input connected to the transmit switch first output, a second input connected to the transmit switch second output, and a third input to receive communication integrity status messages, the transmit monitor monitoring the integrity of communications on the first and second inputs and supplying a the control signal responsive to the communication integrity at a first output, the transmit monitor supplying the communications from the first input to a first transmit path and communications from the second input to a second transmit path;

a first receiver node having an input connected to the transmit monitor second output to receive communications and an output connected to third input of the first relay transmit monitor to supply status messages concerning the integrity of the received communications; and

a second receiver node having an input connected to the transmit monitor third output to receive communications and an output connected to the third input of the first relay transmit monitor to supply status messages concerning the integrity of the received communications; and

wherein the transmit monitor supplies a the control signal to select a transmitter switch output in response to the status messages from the first and second receiver nodes.

31. (Canceled)